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THE EFFECT OF A NUTRITION PROGRAM ON KNOWLEDGE OF
NUTRITION AND NUTRITION ATTITUDES AND PRACTICES
OF FIFTH GRADE STUDENTS IN GRANITE
SCHOOL DISTRICT

by

Nancy Brubaker Sorensen

A thesis submitted in partial fulfillment
of the requirements for the degree

of

MASTER OF SCIENCE

in

Home Economics and Consumer Education

Approved:

UTAH STATE UNIVERSITY

Logan, Utah

1976

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Nancy B. Sorensen
Nancy Brubaker Sorensen

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ABSTRACT

The Effect of a Nutrition Program on Knowledge of
Nutrition and Nutrition Attitudes and Practices
of Fifth Grade Students in Granite
School District

by

Nancy Brubaker Sorensen, Master of Science

Utah State University, 1976

Major Professor: Marie Krueger

Department: Home Economics and Consumer Education

The purpose of this study was to evaluate a six week nutrition program in terms of its effect on nutrition knowledge and its effect on food practices and attitudes. A survey of the dietary food intake was also made. Fifth grade students in Granite School District, Salt Lake City, Utah, were the participants. A pretest and a posttest were used to determine the effect of the program. The tests showed that cognitive knowledge increased in many areas, attitudes became more positive and there was little improvement in dietary intake. Dietary intake was low in fruits, vegetables and milk but adequate in meat.

(93 pages)

INTRODUCTION

In 1969, The White House Conference on Food, Nutrition and Health was held in Washington, D.C. Section Four, Panel 1 of the conference dealt with Nutrition Education in Elementary and Secondary Schools. It recommended that "A dynamic nutrition education program that begins in early childhood and continues through the elementary and secondary schools can help young children acquire positive attitudes toward food and can help older children assume responsibility for their own food selection and prepare them for adult and parental responsibility." This report brought attention to the need for nutrition education as part of the curriculum in the elementary school system.

The Problem

The United States is sometimes referred to as the "land of Plenty" and prides itself in having an educated populace, yet studies have shown that nutritional problems exist here in all age groups and in all economic groups. Low intakes of calcium and vitamins A and C are not infrequent. Another serious national problem is obesity and many people have iron deficiency anemia (School Lunch Division, 1970; Todhunter, 1964). These nutritional deficiencies have a negative influence on school performance and general attitudes toward school (U. S. Department of Agriculture, 1970; Webb and Oski, 1973).

Nutrition education could help cut down the incidence of these problems. Nutrition education is universally needed regardless of income, geographic location or level of education. This knowledge is not inherited

and thus each new generation must be taught what foods to select and why and how the food affects their health (Todhunter, 1969).

Nutrition education usually starts too late (in junior high home economics classes) and reaches only a small portion of the students (Schubert, 1970). In a national survey made in 1971, it was reported that there is apparently no operational, well organized, or comprehensive plan for teaching nutrition in any state. It was found that nutrition education in the elementary schools is usually the decision of each individual teacher (Feeding America's Children at School, 1971). Thus, there seems to be little uniformity in curriculum or step by step concept building of knowledge of nutrition with students from year to year.

Few elementary school teachers have ever had a college class in nutrition or nutrition education as part of their training (Cortes and Standal, 1973; O'Farrell and Kendrick, 1972; Peterson and Kies, 1972). This would indicate a limited knowledge of nutritional concepts and of how to effectively teach them. This lack of training is one reason why few teachers get very involved in teaching nutrition. Another outcome of limited or no training in nutrition is that there are many instances where a teacher teaches the fads and fallacies rather than the science of nutrition (Leverton, 1974).

The problem that can be drawn from the above statements is that there is a need for a systematic nutrition curriculum starting in the elementary grades. To facilitate this, the teachers need to have training in nutrition to aid them in knowing correct nutrition concepts to teach and effective

ways of teaching them. This in turn could help in improving nutrition habits and practices thus improving this aspect of the health of our nation.

The Purpose

In 1973 Granite School District, Salt Lake City, Utah, began a nutrition program in the elementary schools of the West Valley Area. One teacher with a degree in home economics education was hired to organize and teach the program. The program was organized so the teacher taught a series of six 45 minute lessons, one per week for six weeks to each classroom of students. She also provided a worksheet or related puzzle for a follow-up activity for each lesson and offered an optional in-service workshop for classroom teachers. The details of this program are in Appendix A. This program has been taught to over 10,000 students in the last three years.

The purpose of this study was to evaluate the program presented by the home economist in the classrooms where there was a minimum of additional input from the classroom teacher. This would indicate the minimum effect of the program.

The study focused on three areas: (1) an evaluation of the effect of this program on nutrition knowledge, (2) an evaluation of the effect of this program on food attitudes and practices, and (3) a survey of the dietary intake of the students.

Definition of Terms

Nutrition program: The organized nutrition program taught by a

home economics teacher in the West Valley Area elementary schools of the Granite School District between 1973 and 1976. Details of this program are in Appendix A.

Balanced diet: In this study this will refer to a diet that meets the requirements set forth by the Basic Four Food Groups Guide to Good Eating for children of fifth grade age. These requirements are: three servings from the milk group, two servings from the meat and eggs group, four servings from the fruit and vegetable group and four servings from the bread and cereal group.

REVIEW OF THE LITERATURE

The purpose of this review was to examine the need for nutrition education, the status of nutrition education, methods of evaluating nutrition education and the effect of nutrition education. The focus of the above areas was primarily confined to the literature that related to the elementary school situation.

Dr. Leverton (1974) has defined nutrition education as a multidisciplinary process that involves the transfer of information, the development of motivation, and the modification of food habits where needed. It must form a bridge that carries appropriate information from research to the student. During transport, nutrition educators must adapt the information so it can be applied in a variety of everyday situations.

The Need for Nutrition Education

Many children in the United States are undernourished. In 1970, The School Lunch Division of Oklahoma Department of Education conducted a nutritional status survey of 10,000 school age children. Their study reported that four out of ten children needed additional calcium and vitamins A and C. Two out of ten children needed additional iron. Although lower family income resulted in a higher incident of these deficiencies, they found that all income groups had many children with nutritional deficiencies. Five and six year olds had lower intakes of all nutrients than children of all other age levels.

The same four nutrients found lacking in the above study were reported as a problem of all age groups by Todhunter in 1964. In addition, she cited obesity as a serious nutritional problem.

According to a survey done by the U. S. Department of Agriculture (1968), the percent of U. S. households having "good" diets (per person daily intake equal to or above the full Recommended Daily Allowance for seven nutrients) declined from 60 percent in 1955 to 50 percent in 1965. The percent with "poor" diets (less than two-thirds of RDA for one or more nutrients) increased from 15 percent in 1955 to 20 percent in 1965.

A study of school children in North Carolina found that while one-third of the children in the study reported consuming less than 55 percent of the milk recommended in the Basic Four Guide, only 5 percent had less than 55 percent of the amounts in the meat group. Of those listed in the 70 to 100 percent group with meat consumption, 98 percent consumed 85 to 100 percent of the recommended amount of meat or meat alternates. Fruits and vegetables were consumed in the least adequate amounts (Head, 1974).

The attitudes of educators about poor nutrition varies. Teachers and principals are reported to consider poor nutrition to be primarily a result of low family income. Superintendents and food service supervisors have expressed the view that increased income does not necessarily imply better nutritional practices (O'Farrell and Kendrick, 1972).

The National Advisory Council of Child Nutrition (1974) is convinced that the key to improving the nutritional status of children and adults as well

is nutrition education. A study published by Florida Department of Education concludes that an adequate school nutrition program may be regarded as a form of social insurance. It could reduce medical problems, tardiness, and absences (Feeding America's Children at School, 1971).

The Status of Nutrition Education

A Florida study which surveyed a random sample of states, nationwide, reports that there is apparently no operation, well-organized, comprehensive, and sequential plan for teaching nutrition in any state. Nutrition education is scarcely mentioned in the legal or regulatory framework of school nutrition programs such as the school lunch program. There is no evidence of agreement between states as to methods or grade level of emphasis. They conclude that nutrition education is at the periphery of the typical school curriculum (Feeding America's Children at School, 1971).

Other reports would indicate that some states have been making an effort to support nutrition education. In California the Dairy Council nutrition education program is used extensively in the public school system. A survey of 306 second grade teachers found that 97.4 percent felt teaching food and nutrition is part of their job; approximately 75 percent had received nutrition education materials from the Dairy Council and approximately 50 percent had previous personal contact with the Council (Lovett, Barker and Marcus, 1970). Arizona Department of Education had widely distributed a packet of curriculum materials for the elementary grades (Home Economics Section, 1975).

This summer (1976) the investigator worked with the Utah State Board of Education to write a scope and sequence for teaching nutrition to grades kindergarten through twelfth grade. This is a beginning for a sequential plan for teaching nutrition. In interviews with Jean Hamilton and Gladys Gardner, State Food Service Specialists, the investigator determined that there was no state-wide nutrition education program with direction from the State Board of Education and no state recommended curriculum guide for nutrition in the elementary grades. However, they referred to several projects in elementary schools in several districts in addition to the program this study is evaluating. The investigator had telephone interviews with the personnel involved in most of these programs.

From these interviews it was determined that Alpine School District, Box Elder School District, and Davis School District have some type of nutrition program or resources to aid limited numbers of teachers. Salt Lake District had a program similar to the one involved in this study from 1972 to 1975; however, due to a lack of funding it has been discontinued. Salt Lake County Extension has a program taught by trained paraprofessionals which has reached many students. A graduate student at Utah State University has been working on developing curriculum in nutrition for the elementary school level. More details about these programs are given in Appendix B.

Possibly other states have placed more emphasis on nutrition education in recent years. However, there does not seem to be a dramatic change in the status of nutrition education from the Florida study cited above.

Chethik (1974) reported barriers she found that contributed to the exclusion of nutrition education from the curriculum. (1) Teachers and administration give priority to the development of the academic skills in their students. (2) Though teachers may desire to teach nutrition they do not know where to begin and are reluctant to spend a considerable amount of time developing a unit. (3) The school nurse is often viewed by the school community as the health and nutrition resource person; however, the nursing staff is usually very small and all their time is spent caring for children who are currently ill. (4) School administration and teaching staff believe that children learn best about nutrition at home and from parents. They doubt that nutrition education is needed because they believe that children eat well.

Schubert (1970) said that veteran teachers and administration will candidly admit this has been a neglected area. Usually junior high home economics classes are the starting point of nutrition education. These classes usually reach only a limited number of students. He felt that nutrition education needs to begin at an earlier age than junior high age.

Part of the problem of lack of nutrition education at the elementary school level is the lack of training that teachers have in this field. In a Nebraska study, teachers scored low on a nutrition knowledge test. This survey found that few of the teachers had any formal training in nutrition (Peterson and Kies, 1972). O'Farrell (1971) and Leverton (1974) also report a lack of teacher preparation in nutrition. A survey of teachers in Hawaii reported 5 percent had had some nutrition training after college. Twenty-six percent had had either a health or a nutrition class as an undergraduate although it was not

broken down as to which they took (Cortes and Standal, 1973).

Callahan (1973) made an interesting observation. She reported that if every dietitian in the nation spent 100 percent of their time in the schools, the dietitian-student ratio would be 1:29,000. She, therefore, felt that the major thrust should be made with in-service teacher training workshops. Nationwide there are over two million educators already in teaching positions. Reaching these people should be top priority.

Methods of Evaluating Nutrition Education

Nutrition education is often presented as a unit or a program. This situation tends to facilitate the pretest-treatment-post-test type of evaluation. This design was used by Bell and Lamb (1973); Boysen and Ahens (1972); Cooper and Philp (1974); Head (1974); and Lovett, Barker and Marcus (1970). Baker (1972) used this design but additionally used a time lapse test given several months after the post-test. A "within school" control was used in the above studies. The unit or program was taught to one group of students in the school and a similar group of students in the school did not receive the unit or program and served as the control.

Using the above described design, various methods were used to determine the effect of the education on food practices. Plate waste surveys (Bell and Lamb, 1973; Head, 1974), 24-hour food intake recalls (Baker, 1972; Head, 1974) and 24-hour food intake records (Baker, 1972) were used to determine change in dietary habits. Boysen and Ahrens (1972) examined lunches brought

from home for content and observed waste.

Attitudes were determined by questionnaires (Cortes and Standal, 1973) and by home interviews with parents (Beyer and Morris, 1974). Cooper and Philp (1974) felt that claimed food consumption indicated change in attitude.

Cognitive knowledge was measured by written test in all of the studies stated in this section. Various types of questions were used such as multiple choice items, true-false items, sentence completion and food classification.

The Effect of Nutrition Education

In the last several years, a number of nutrition education program have been tried. Several of them have been evaluated to see how effective they were.

In a study of 200 fourth and fifth graders in Iowa, the students were tested before and after a nutrition unit. The unit consisted of 13 lessons, each 30 minutes in length plus two follow-up experiences. Scores on a nutrition test were significantly higher for the experimental classes than for the control classes when re-testing was done within a week after completion of instruction. No significant changes in diet due to the program were observed (Baker, 1972).

A similar study with 1,913 fifth graders in Texas also showed an increase of cognitive knowledge after a six week nutrition unit was taught. Although dietary behavior was not modified greatly, this study found that 8.0 percent of the experimental group increased milk consumption compared to 3.9 percent of the control group. Vegetable consumption increased with 6.1 percent of the experimental group and there was no increase with the control group (Bell

and Lamb, 1973). The increase in milk would increase the consumption of calcium and increased vegetable consumption would increase the vitamin A in the diet.

Head (1974) did a study in North Carolina involving grades five, seven and ten. All fifth grade classes and one seventh grade class significantly improved their knowledge of nutrition as measured by cognitive tests. Improvement in diets of fifth graders was not different from the control group; however, both groups made marked improvement. The amount of change both in knowledge and diet decreased progressively at higher grade levels. This study had a sample of 4,700. Regular classroom teachers participated in a one-week workshop and then developed their own plans for integrating nutrition into their curriculum.

Forty-three third grade classes were the sample in a study conducted in Canada. Teachers who had attended a three hour workshop taught a unit that they had been oriented to at the workshop. Its basic objectives were centered around classifying food into the Basic Four Food Groups and planning balanced meals. The results of this study concluded that more than 70 percent of the teachers who took the workshops taught some nutrition education to their classes; students in classes taught by workshop-trained teachers showed improvement in nutrition knowledge; and there was improvement in claimed eating behavior by the children in those classes. Mean scores of the test group increased 26 percent over the control on food classification and 8 percent over the control on recognition of a balanced meal. Five

percent more of the test group than the control group ate all four food groups for breakfast (Cooper and Philp, 1974).

Boysen and Ahrens (1972) conducted a study with two second grade classes from an elementary school in Maryland. The experimental class received a four-week nutrition unit consisting of 30-minute daily segments. The control received no special nutrition unit. This unit of instruction improved the knowledge of the experimental group compared with the control group. A 70.5 percent increase on test scores was reported for the experimental group compared to a 28.7 percent increase for the control group. A parent survey revealed that perhaps some improvements in eating habits were occurring at home that were not apparent at school. There was, however, a trend to try more milk during lunch time at school.

In a camp situation with diabetic children, a three week program with emphasis on tasting new vegetables was presented. This study showed a significant increase of vegetable consumption over the control group (Alford and Tibbets, 1971).

Summary of the Review of Literature

There are many undernourished children in the United States. Nutrients often found lacking are calcium, vitamins A and C and iron. The fruits and vegetable group and the milk group are often not eaten in the quantities recommended by the Basic Four Food Guide.

Apparently there are few organized programs for teaching nutrition.

This is especially true pertaining to statewide comprehensive and sequential programs. Also, elementary school teachers generally lack any formal training in nutrition.

Studies have evaluated nutrition education programs using the pretest-treatment-post-test design. These studies have concluded that cognitive knowledge was significantly improved. Dietary habits were improved to a lesser degree and in some cases not at all as indicated in the literature.

METHODS OF PROCEDURE

This study used the static-group comparison design (Huck, Bormier and Bounds, 1974). The format used was the pretest-treatment-post-test design.

The Sample

The nutrition program in the West Valley Area of Granite School District has been in operation for three years. The schools from which the sample was taken were those where the program was taught in the fall of 1975. Four schools were in the sample plus one control school. Two of the schools were program participants for the first time that year and two of the schools were second year participants.

The control school, which had never participated in the program, was randomly selected from schools just bordering the West Valley Area. All of the West Valley Area schools had participated in the program and thus were not eligible as a control. A "within school" control was not possible due to the fact that the program had been strongly promoted to all teachers and negative feelings may have resulted if some classes were not included.

The fifth grade was chosen as the grade to evaluate. The investigator felt that this grade had sufficient reading and writing skills to complete the instrument quite accurately. The class in each school to be tested was selected randomly; the method being to select the class whose teacher's

last name came first in the alphabet. The selected teachers were asked to wait until after the study was completed to give additional lessons or projects on nutrition beyond the follow-up worksheet provided by the home economics teacher.

All of the classes were tested in the fall (hereafter referred to as test one) before the nutrition program was presented and retested again (hereafter referred to as test two) two weeks following the presentation of the program. The time lapse between tests was eight weeks. There was the same time lapse between tests of the control group. The same instrument was used in both test one and test two.

The total sample was 122 students. Those that were first year participants numbered 48, second year participants numbered 47 and the control group numbered 27. Table 1 summarizes the descriptive data about the sample and is the key to the letter names assigned to each school. Schools were referred to by these letter names hereafter in this paper. Data on participation in the free or reduced price school lunch is included on this table. This information is an indication of the economic status of the patrons of the school. The investigator used this data to see if there was any relationships between this factor and the data collected from the instrument.

Permission to use the students for the sample was obtained from Granite School District. Phyllis Woodbury, Home Economics Staff Associate for the district, provided a cover letter for the application for permission form giving positive support for the study. Copies of the above mentioned letter and application are in Appendix D.

Table 1. Descriptive data about the sample

	Control	School A	School B	School C	School D
Name of school	Plymouth	Webster	Magna	Hillsdale	Monroe
Grade	Fifth	Fifth	Fifth	Fifth	Fifth
Year in the program	--	First	First	Second	Second
N completing section one and two of the questionnaire	27	21	27	26	21
N completing the 24-hour food recall chart on both test one and test two	24	18	23	26	17
Percent receiving reduced price school lunch*	2.3	0.0	5.2	1.9	7.2
Percent receiving free school lunch*	9.6	53.0	21.1	17.6	25.7

*Percent is figure from total school lunch participants in each school February 16, 1976 to March 19, 1976 (Granite School District, 1976). The Eligibility Scale for Free or Reduced Price Meals is in Appendix C.

The Instrument

The instrument (copy in Appendix E) included the following three sections:

- (1) A nutrition attitudes and practice survey.
- (2) A nutrition knowledge test.
- (3) A 24-hour food intake recall chart.

The knowledge test was based on the behavioral objectives of the nutrition program. In developing the instrument, the investigator reviewed questionnaires, tests and surveys (Baker, 1972; Hamilton, 1975; Igel, 1972; Kilander, 1968 and others that are unpublished and no author's name was attached) that dealt in evaluation of nutrition knowledge, attitudes and practices.

The questionnaire was pretested in a fifth grade class which was not in the sample. The reliability was determined by the test-retest method using the formula for percentage of agreement.

The validity of the instrument was by the "face validity" method using a jury of people in the field of nutrition education. The jury was composed of Margie Newman, director of the Expanded Food and Nutrition Program in Salt Lake County; Sharon Crapo who was the Director of the Utah Dairy Council at the time she evaluated it; and Elaine Kirkham who was a nutrition teacher at Kearns High School at the time she evaluated it. The jury felt the instrument was valid, suggesting only minor wording changes. The instrument was revised incorporating the suggestions of the jury.

The instrument was administered by the investigator in the classroom. Oral instructions were given at the time the questionnaire was filled out. Students marked their responses to each question as it was read aloud. This technique was chosen as a control factor so that low reading ability would not interfere with the completion of the questionnaire. The instructions and the questionnaire administration was uniform with the entire sample.

Analysis of Data

The attitudes and practices section of the instrument contained two types of questions: true-false questions on various attitudes and practices and an open ended question to list favorite snack foods. The true-false answers were tallied and the result for each question was computed in percentages. The frequency that various snacks were listed was tallied and then the foods were arranged in a rank order with the most popular item listed first. The five highest ranked snack foods and their frequency mentioned is compiled for each school as well as a composite from Schools A, B, C, and D.

The knowledge test used various forms of questions. The true-false questions were treated as those listed above. The food classification question had ten foods to be classified into the correct food group. The percent of the sample from each school that scored a perfect score on this item was figured, as was the percent of the students in each school with a perfect score on selecting a balanced lunch. Multiple item questions and fill in the blank questions were used to test the knowledge of food sources and body functions of

nutrients. Mean scores for these eleven questions were figured for each school. Mean scores for the total nutrition knowledge test were also computed.

Using the information recorded on the 24-hour food recall chart, the diets from each school were analyzed and ranked on a Likert type scale of five categories: very good, good, fair, poor and very poor. Criteria and assigned point value for each category is as follows:

- a. Very good (8 points): The diet was balanced.
- b. Good (6 points): The diet was missing no more than one serving from one or more of the food groups.
- c. Fair (4 points): The diet was missing no more than two servings from one or more of the food groups but still had each group represented.
- d. Poor (2 points): The diet had at least one serving from each food group but did not qualify for the above categories.
- e. Very poor (0 points): The diet was completely lacking in one or more of the food groups.

Mean scores of the dietary intake were computed. The frequency distribution of each score for each school was illustrated in bar graphs.

All of the above data compares results of test one with results of test two. The 24-hour recall data from both tests was also combined to see what percent of the sample had the Basic Four recommended number of servings in either or both test one or test two.

Statistical tests of significance were not used because there was not a control class within each school. The control school was used in this study as a general reference but would not have been statistically valid.

RESULTS AND DISCUSSION

The purpose of this study was to (1) evaluate the effect of the program on nutrition knowledge, (2) evaluate the effect of the program on food attitudes and practices, and (3) survey the dietary intake of the students. The results of each of these objectives will be discussed in this chapter.

The Effect on Nutrition Knowledge

There were several factors that were taken into consideration when examining the effect of the program on knowledge. They were the effect of the number of years of participation in the program, the effect of economic status. It was also noted in which areas of knowledge there seemed to be the most change take place.

Mean scores on the entire test were higher for Schools C and D who were second year participants than for Schools A and B and the Controls (Table 2). Marked higher scores for second year participants were evident on several questions in the test. The percentage of students that had a perfect score on selecting a balanced lunch was 85 percent for both Schools C and D on test one and was 67, 65, and 62 percent respectively for the Control, School A and School B (Table 3). The true-false question "Peanut butter, dry beans and eggs can be used as meat substitutes," which is considered true, also showed this trend (Table 4). The percentage of students with the correct

Table 2. Mean scores for the total nutrition knowledge test

	Control	School A	School B	School C	School D	Mean ^a
Test one	24.9	22.1	25.6	28.3	27.4	25.85
Test two	26.7	24.1	27.1	30.6	29.6	27.85

^aMean column is the mean of scores from Schools A, B, C, and D.

Table 3. Percent of sample with perfect scores on the selecting a balanced lunch part of the test

	Control	School A	School B	School C	School D	Mean ^a
Test one	67	65	62	85	85	74.3
Test two	85	96	89	96	100	95.5

^aMean column is the mean of scores from Schools A, B, C and D.

Table 4. Percent of sample having correct answers to the true and false questions on the knowledge test

	Control	School A	School B	School C	School D	Mean ^a
You should eat five or more servings every day from the bread and cereal group (False)						
Test one	89	83	78	88	81	82.5
Test two	78	87	78	88	90	85.8
Peanut butter, dry beans and eggs can be used as substitutes for meat. (True)						
Test one	37	22	59	96	90	66.8
Test two	45	87	96	92	95	92.5
A well balanced diet includes eating foods from all four food groups. (True)						
Test one	93	96	96	96	90	94.5
Test two	89	83	100	100	90	93.3
Food can supply the necessary vitamins and minerals for good health. (True)						
Test one	89	96	96	96	86	93.5
Test two	93	87	96	96	95	93.5
Breakfast is not an important meal. (False)						
Test one	93	83	96	92	90	90.3
Test two	93	87	85	100	95	91.8

^a Mean percentages are for Schools A, B, C and D.

Table 4. Continued

	Control	School A	School B	School C	School D	Mean
A fifth grader should have three servings from the milk group every day. (True)						
Test one	89	91	70	69	90	80.0
Test two	85	96	81	85	95	89.3
Foods in the fruit and vegetable group provide alot of vitamins A and C. (True)						
Test one	93	96	100	96	86	94.5
Test two	93	96	93	96	95	95.0
Bones and teeth need calcium and vitamin D to be strong and healthy. (True)						
Test one	96	87	96	100	95	94.5
Test two	93	66	81	92	82	80.3
A nutritious snack is one chosen from the four food groups. (True)						
Test one	81	70	78	77	76	75.3
Test two	85	43	70	88	62	65.8
Proteins' main function or job in the body is to improve your eye sight. (False)						
Test one	59	56	70	69	62	64.3
Test two	63	39	63	81	76	64.8

Table 4. Continued

	Control	School A	School B	School C	School D	Mean
When bread is enriched it means vitamins and minerals have been added to it. (True)						
Test one	67	39	81	81	67	67.0
Test two	81	70	81	96	86	83.3

answer was 96 and 90 for Schools C and D, and was 37, 22 and 59 percent for the Control, School A and School B on test one. Another part of the test that had higher scores for those in the program for the second year was the part of the test measuring knowledge of food sources and body functions (Table 5, page 28). The mean scores on test one were 6.2 and 6.1 for Schools C and D, and 5.1, 3.3, and 5.0 for the Control, School A and School B.

On the above questions where second year schools had higher scores than the other schools on test one, test two showed that these second year schools made an equivalent or larger positive change than the other schools. The one exception is where 100 percent of the students made a perfect score on selecting a balanced lunch. This test question may not have been challenging enough to measure the entire amount of change in knowledge in this area.

There were several questions that point out increased knowledge in certain areas for all of the experimental schools. The question about meat substitutes stated above was the question that showed the most change. There was 66.8 percent of the students that answered it correctly on test one and 92.5 percent that answered it correctly on test two. This is an increase of 38.5 percent. The control increased 21.6 percent. On the question "A fifth grader should have three servings from the milk group every day," considered true, the number of the experimental group that answered correctly increased 11.6 percent and the Control decreased by 4.5 percent. The question "When bread is enriched it means vitamins and minerals have been added to it," considered true, had an increase of 24.3 percent with Schools A, B, C and D and an increase of 20.0 percent with the Control. These above questions are referred to on Table 4.

The part of the test requiring the student to select a balanced lunch (Table 3) also had an increase in the number of those making a perfect score. Schools A, B, C and D had 74.3 who made a perfect score on test one and 95.5 who did on test two. This was an increase of 27.9 percent. The Control increased 26.8 percent. Those with a perfect score on the classifying the foods part of the test increased 99.0 percent for experimental schools and 200.0 percent for the Control (Table 6). The Control's high percent of increase is because the number with perfect scores on test one is very low. Other questions showed increases of one or two percentage points and in some cases there was a decrease of percentage points.

School A had 53 percent of their school lunch participants receiving free school lunch. This is approximately twice as many as Schools B, C and D; and five times as many as the Control. This would indicate that it had the lowest economic status. It is interesting to note that School A made the most dramatic change from test one to test two in the questions mentioned above with the exception of the one pertaining to servings of milk. This school increased 250.0 percent on the question about meat substitutes and 79.5 percent on the question about enriched bread. There was a 47.7 percent increase of students that made a perfect score on selecting a balanced lunch and a 975.0 percent increase of those who made a perfect score on the classifying foods question on test two. See Tables 3, 4 and 6.

Table 5. Mean scores on the part of the knowledge test testing knowledge of food sources and body functions of nutrients. N = 11

	Control	School A	School B	School C	School D	Mean ^a
Test one	5.1	3.3	5.0	6.2	6.1	5.15
Test two	5.1	4.0	5.4	7.4	7.0	5.95

^aMean column is the mean of scores from Schools A, B, C and D.

Table 6. Percent of sample with perfect scores on the food classifying part of the test

	Control	School A	School B	School C	School D	Mean ^a
Test one	11	4	22	35	23	21.0
Test two	33	43	26	50	48	41.8

^aMean column is the mean of scores from Schools A, B, C and D.

The Effect on Attitudes and Practices

The change in dietary intake according to the data collected on the 24-hour food recall was almost nonexistent. The mean score was 4.63 on test one and 4.55 on test two; a decrease of .08 points. The Control decreased their mean score by .67 points (Table 7). However, Schools A, B, C and D all reported a decrease in the frequency of intake of empty calorie snacks (Table 8).

The part of this section that had true-false questions had various results. Some attitudes and practices seemed to improve, others did not. On some questions the second year participants had better scores on test one than the other schools. The percent for Schools C and D was lower on number that felt they did not eat a well balanced diet; that felt they preferred sweet snacks rather than fruit, milk or crackers; that felt they did not like to try new foods; and that did not eat breakfast most of the time (Table 9).

Schools C and D also had empty calorie snack foods ranked lower than the other schools (Table 10). In the top five ranked snack foods, School C ranked pop third and candy not at all on test one and neither ranked on test two. School D ranked pop fifth and candy not at all on test one and neither ranked on test two. Both candy and pop ranked in the top five with the other schools on test one and either candy or pop or both still ranked on test two.

The following are mean percentages of the scores on individual question on practices and attitudes (Table 9) for Schools A, B, C and D. On test one 31.5 percent of the students felt they did not eat a well balanced diet. On

Table 7. Mean scores of dietary food intake computed from information reported on the 24-hour food recall charts

	Control	School A	School B	School C	School D	Mean ^a
Test one	4.75 ^b	4.33	4.52	4.76	4.94	4.63
Test two	4.08	4.33	4.17	4.53	5.18	4.55

^aMean column is the mean of the scores from Schools A, B, C and D.

^bThe key to the scoring method is found on page

Table 8. Frequency of empty calorie snacks (pop and candy) reported on the 24-hour food recall charts

	Control	School A	School B	School C	School D
Test one	7	14	17	24	15
Test two	11	13	10	15	1

Table 9. Data from the practices and attitudes section of the questionnaire

	Control	School A	School B	School C	School D	Mean ^a
Percent that felt they <u>did not</u> eat a well balanced diet.						
Test one	22	42	19	27	38	31.5
Test two	22	33	26	19	29	26.8
Percent that felt the basic four food groups <u>is not</u> a guide to good eating.						
Test one	0	10	0	0	0	2.5
Test two	0	5	0	0	5	2.5
Percent that <u>did not</u> think it was important to eat breakfast.						
Test one	4	10	7	4	10	7.8
Test two	0	10	4	4	5	5.8
Percent that felt they preferred sweet snacks rather than fruit, milk or crackers.						
Test one	44	29	33	27	19	27.0
Test two	26	29	26	15	19	22.3
Percent that felt they <u>did not</u> like to try new foods.						
Test one	33	29	26	23	19	24.3
Test two	41	48	37	35	23	35.8

^aMean percentages are for Schools A, B, C and D.

Table 9. Continued

	Control	School A	School B	School C	School D	Mean
Percent that claimed to eat only foods they really know they like.						
Test one	52	43	48	58	38	46.8
Test two	59	48	37	65	33	45.8
Percent that felt regular use of vitamin pills is necessary to get enough nutrients.						
Test one	81	81	85	88	71	81.3
Test two	78	95	81	69	71	79.0
Percent that reported that they took vitamin pills daily.						
Test one	30	24	48	58	48	44.5
Test two	48	19	26	46	48	34.8
Percent that <u>did not</u> eat breakfast most of the time.						
Test one	22	33	18	12	10	18.3
Test two	22	38	4	12	19	18.3
Percent that felt it was not important to learn about nutrition.						
Test one	0	10	0	4	10	6.0
Test two	0	10	0	4	0	3.5

Table 9. Continued

	Control	School A	School B	School C	School D	Mean
Percent that liked lessons about nutrition and food.						
Test one	78	71	96	85	95	86.8
Test two	85	100	96	96	100	98.0

Table 10. Favorite snack foods reported on the questionnaire.

	Food	Test one		Food	Test two	
		Frequency	Percent of total mentions		Frequency	Percent of total mentions
Control ^a	Fruit	15	20	Fruit	20	27
	Candy	12	16	Cookies with milk	9	12
	Milk	10	14	Candy	8	11
	Soda pop	8	11	Cheese	8	11
	Cheese	6	8	Soda pop	8	11
School A	Candy	10	17	Fruit	13	20
	Soda pop	10	17	Soda pop	11	17
	Milk	8	14	Cookies	9	14
	Fruit	7	12	Milk	8	12
	Cookies	7	12	Candy	8	12
School B	Fruit	15	20	Fruit	17	23
	Candy	11	14	Soda pop	10	14
	Milk	10	13	Milk	9	12
	Soda pop	7	9	Cookies	8	11
	Peanut butter sandwich	7	9	Crackers	6	8
School C	Fruit	16	23	Fruit	12	18
	Milk	9	13	Cookies	12	18
	Pop	9	13	Milk	11	16
	Cookies	9	13	Cheese	8	12
	Raisins	7	10	Raisins	5	7

^aThe five highest ranked foods are listed for each school.

Table 10. Continued

		Test one		Test two		
	Food	Frequency	Percent of total mentions	Food	Frequency	Percent of total mentions
School D	Fruit	16	30	Milk	13	23
	Milk	9	17	Fruit	12	21
	Cookies with milk	6	11	Cheese	9	16
	Cheese	5	9	Cookies and milk	4	7
	Soda pop	4	7	Crackers	4	7
Sum of total data from Schools A, B, C, and D	Fruit	54	21	Fruit	54	20
	Milk	36	14	Milk	41	15
	Soda pop	30	12	Cookies	32	12
	Candy	28	11	Cheese	27	10
	Cookies	25	10	Crackers	27	10
	Cookies with milk	20	8	Soda pop	26	9
	Peanut butter sandwich	17	7	Cookies with milk	19	7
	Cheese	17	7	Candy	18	7
	Raisins	13	5	Peanut butter sandwich	10	4
	Raw vegetables	9	3	Raw vegetables	6	2

test two 26.8 percent felt that way; a difference of 4.7 percent. The difference for the Control was 0.0 percent. There was no difference on the mean scores of those that felt the basic four food groups were a guide to good eating; 97.5 percent felt this way.

On test one 7.8 percent did not think it was important to eat breakfast and 18.3 percent reported that they did not eat breakfast most of the time. Only 5.8 percent still did not think it was important on test two but 18.3 percent still claimed not to eat breakfast most of the time. The Control had 22 percent that did not eat breakfast on each test.

Those that felt they preferred sweet snacks rather than fruit, milk or crackers decreased from 27.0 percent on test one to 22.3 percent on test two. The Control had a decrease of 18 percent.

A surprise to the investigator was that 11.5 percent more of the students felt they did not like to try new foods as reported on test two compared with test one. The nutrition program offered several tasting experiences which seemed to be greeted with enthusiasm and often they were recipes that were new to the students.

A large number (81.3 percent on test one and 79.0 percent on test two) felt that regular use of vitamin pills was necessary to get enough nutrients. However, less than half reported that they took them daily. It was 44.5 percent for test one and 34.8 percent for test two.

All of the schools ranked the empty calorie snacks candy and pop lower on test two. The change was greater in all the experimental schools

than in the Control. The combined data from Schools A, B, C and D had pop ranked third and candy fourth on test one and had pop ranked sixth and candy eighth on test two. Fruit and milk ranked first and second on both tests and raw vegetable ranked last on both tests (Table 10).

School A which seems to have the lowest economic status had similar changes in practices and attitudes to the other schools. One exception would be that only 71 percent on test one said they liked lessons about nutrition and food and 100 percent on test two. This is a 41.0 percent increase. More of the students in the other schools felt affirmative from the beginning. The investigator felt this was an important change of attitude that would be prerequisite to teaching and changing other attitudes. The mean percentage of Schools A, B, C and D that responded positively on test one was 86.8 percent and 98.0 percent on test two. The Control changed 7.0 percentage points.

The Dietary Intake of the Students

In order to teach nutrition knowledge with the hope of improving attitudes and practices, an evaluation of dietary status would be useful to indicate areas of need. For this reason the investigator felt this part of the data would be of value.

The mean scores of dietary status computed from the information reported on the 24-hour food recall chart ranged from 4.08 to 5.18 (Table 7). A score of four points was considered a "fair" diet; that indicated that the diet

was missing no more than two servings from one or more of the food groups but still had each food group represented. A score of six points was considered a "good" diet; that indicated that the diet was missing no more than one serving from one or more of the food groups. Most of the students fell closest to the "fair" category. Bar graphs show the frequency distribution of diets of the students from each school (Figures 1, 2, 3, 4 and 5).

Table 11 points out the food groups that were most often omitted from the diets. Only 42.4 percent had four servings of fruits and vegetables daily. This is the food group that is most often not eaten in the amounts recommended. Milk consumption was also low. There were 77.7 percent who had three servings from the milk group daily. Two servings from the meat group were eaten daily by 97.3 percent of the students. These findings are similar to those in the study by Head (1974). These eating patterns would also indicate that the diets may be low in vitamins A and C which is supplied mostly from fruits and vegetables and in calcium which is supplied primarily from the milk group. These are nutrients found deficient in many diets by other studies (School Lunch Division, 1970; Todhunter, 1964).

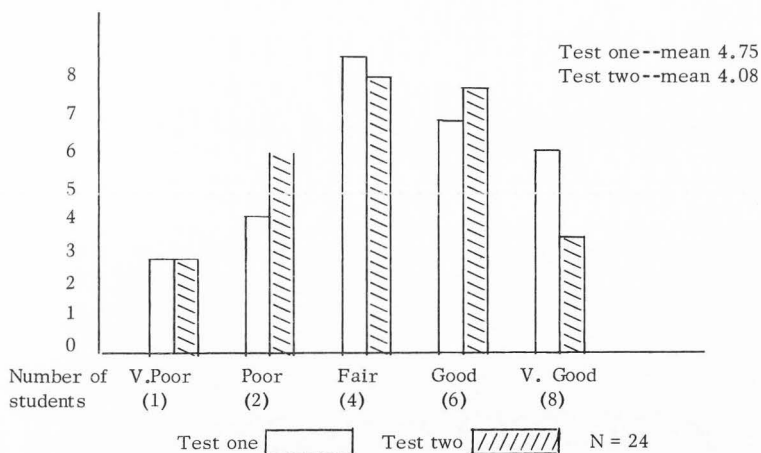


Figure 1. Dietary intake frequency of Control. Explanation of how the score was determined is found on page 20.

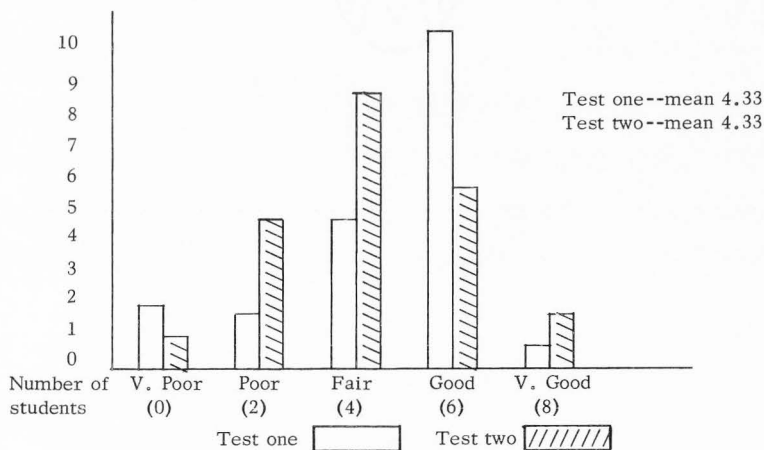


Figure 2. Dietary intake frequency of School A. Explanation of how the score was determined is found on page 20.

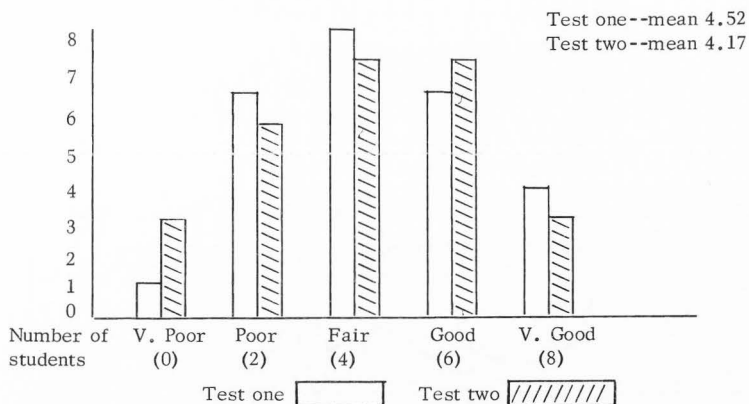


Figure 3. Dietary intake frequency of School B. Explanation of how the score was determined is found on page 20.

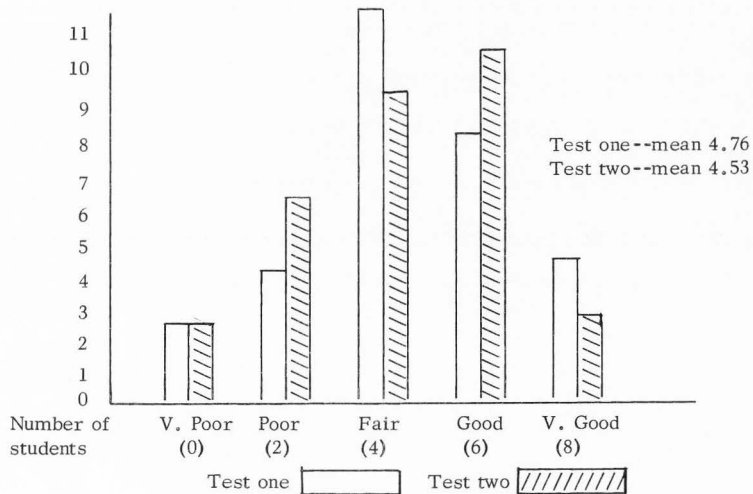


Figure 4. Dietary intake frequency of School C. Explanation of how the score was determined is found on page 20.

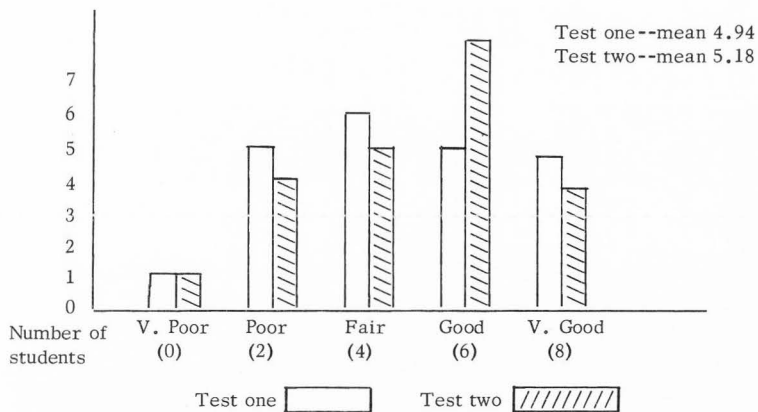


Figure 5. Dietary intake frequency of School D. Explanation of how the score was determined is found on page 20.

Table 11. Percent of sample that had the Basic Four recommended number of servings in either or both test one or test two

Control	School A	School B	School C	School D	Mean ^a
Fruit and vegetable group--four servings.					
62.5	44.4	39.1	30.8	35.3	42.4
Milk group--three servings.					
58.3	50.0	78.3	73.1	70.6	77.7
Bread and cereal group--four servings.					
83.3	88.9	87.0	76.9	100.0	87.2
Meat and eggs group--two servings.					
100.0	100.0	100.0	92.3	94.1	97.3

^aMean includes all five schools.

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

The literature points out that there are many undernourished children in the United States. The fruits and vegetable group and the milk group are often not eaten in the quantities recommended by the Basic Four Food Guide. Consequently the nutrients often found lacking are vitamins A and C and calcium. These deficiencies may lead to poor health and poor performance in school. This study found the children in the west valley of Salt Lake City to have similar dietary deficiencies. Nutrition education programs should aid in overcoming this problem.

There are few comprehensive nutrition programs in the schools in the United States; however, in recent years several programs have taken place. A program was started in 1973 in the Granite School District, West Valley Area. It was taught by a home economist who presented a series of six 45-minute lessons taught once a week for six weeks to individual classes. By 1976 all 21 schools in that area had participated at least one year in the program but no study had been made to determine the effect of the program.

The purpose of this study was to (1) evaluate the effect of that program on nutrition knowledge, (2) evaluate the effect of that program on food attitudes and practices, and (3) survey the dietary food intake of the students.

The sample was randomly chosen and was made up of five fifth grade

classes, each from a different school. It was the second year of participation for two of the schools, the first year for two of the schools and one school which served as a control was not a participant at all.

This study was designed as an experimental study and the format used was the pretest-treatment-post-test. The pre-test was immediately before the six lesson unit and the post-test was two weeks following the unit. Test one (the pre-test) and test two (the post-test) were the same. The instrument (found in Appendix E) included the following three sections: (1) a nutrition attitudes and practices survey, (2) a nutrition knowledge test, and (3) a 24-hour food intake recall chart.

The data from the instrument was compiled and the results were examined to see (1) if years in the program had any effect, (2) to see the areas of most change, and (3) to see if the economic status of the school had any effect. Both second year participants scored higher on the knowledge section of test one than the other schools. Marked higher scores were evident on several of the questions. One example is the percentage of students that had a perfect score on selecting a balanced lunch on test one was 85 percent for both second year schools and was 65 and 62 percent for first year school and 62 percent for the Control. At the time of test one, first year participants had not had the program and it had been about a year since second year participants had been exposed. These high schools of the second year participants would indicate that there was some retention from the year before.

The areas that showed the most change from test one to test two for

all experimental schools were knowledge of meat substitutes and the ability to select a balanced lunch. The school with the lowest economic status, also a first year participant, made the most dramatic change on the above two areas and also on a question about enriched bread and one on classifying foods into food groups. This school also had the most change of attitude on the question asking if they liked lessons about food and nutrition. The entire class was positive about this on test two while only 71 percent were positive on test one.

The attitudes and practices section of the questionnaire showed a larger percentage of students of second year schools on test one to have more nutritionally sound attitudes and practices. These included those who felt they ate a balanced diet, preferred nutritious snack to empty calorie snacks, liked trying new foods and ate breakfast most of the time. Attitudes that made the most change for the entire experimental group were those who felt they ate a balanced diet, preference for nutritious snacks and positive acceptance of the nutrition program.

The dietary food intake scores of the program participant made no change; however, the intake of empty calorie snacks declined. Those in the program for the second year had slightly better diets than the mean and the low economic group had slightly less adequate diets. All of the mean dietary intake scores fell between the "fair" and "good" ranking meaning that they were missing one or two servings of one or more of the food groups but still had at least one serving from each of the Basic Four Food Groups. The 24-hour food recalls indicates that diets were lowest in the fruit and vegetable group and second lowest in the milk group.

To summarize, the results of this study reflected results found in the literature. The nutrition program increased cognitive knowledge in many areas, had some positive effect on attitudes and had little effect on dietary status. Those in the program for the second year scored higher on many parts of each section of the test than did the first year schools and the control, thus indicating that the program made some long term changes. The school with the lowest economic status made the most dramatic change on several of the questions perhaps indicating that the subject matter was new to them. Fewer of the students in that school were enthused about the program at the beginning but on the post-test 100 percent said they liked classes about food and nutrition.

Conclusions

In Granite School District the elementary school nutrition program has been a popular program. In 1973 and 1974 it was funded by state vocational funds. When these funds were no longer available the district identified funds in their vocational budget to continue and to expand the program. Over 8,000 students participated in the program in 1975-76. In 1974 an in-service class with credit through Utah State University Extension Division was offered to the teachers in the participating schools. This too has expanded and the school district was so pleased with it that they now pay the instructor thus lowering the fees of those who take the class. The popularity and expansion of this program was evident through increased participation and the desire of the

schools to have the program back in the school the following year. In spite of the enthusiastic reception of this nutrition program, the actual effect of the program on the students had not been investigated.

The nutrition program was taught to grade levels K-6; however, this study was designed to evaluate the effect of the nutrition program on fifth grade students. The investigator feels that this study shows that the nutrition program has definite merit. The results of this study lead to the following conclusions:

1. The nutrition program (the six 45-minute lessons taught by the home economist) was beneficial to the students. The students increased their knowledge, attitudes were changed for the positive and preferences for nutritious snacks over empty calorie snacks increased. The investigator feels that the positive change could be greater in other classrooms where additional materials and activities were used by the classroom teacher to supplement the program.
2. Longevity in the program increased the effectiveness of the program. Second year students had higher scores on the knowledge test one and showed an increase of knowledge on test two. The high scores on test one indicated that the material was retained over the summer. The second year schools also had more positive food attitudes. They ranked pop and candy lower than the other schools did as popular snack foods. As a result the investigator feels that a nutrition program or unit should be in the curriculum every year.
3. An exciting program with stimulating activities such as this one

made attitudes toward learning about food and nutrition very positive. Ninety-eight percent of the students liked lessons on food at the end of the program. One first year school had a 41 percent increase of those who liked nutrition lessons from test one to test two. This increase was in the school with the lowest economic status perhaps indicating that the subject matter was new to them.

4. Food habits and dietary intake were more difficult to change. Actual dietary intake changed very little from test one to test two. This was determined by using a 24-hour food recall; however, the snacking preferences listed by the students made a positive change to more nutritious snacks and few empty calory snacks. The investigator feels that a continual and comprehensive program with stress on the value of a good diet may further implement change in this area. Also, elementary students are usually dependent upon their parents for their meals so parent education could play a key role in improving food habits.

5. Teacher education plays a vital part in nutrition education in the elementary school. Although the teacher of the classes used in the sample for this study were asked to refrain from giving additional material and instruction so the basic program could be evaluated, all other teachers were encouraged otherwise. The home economist served as a model as she presented her lessons, showing how games, activities and food experiences can be used to teach nutrition. This modeling seemed to greatly aid in boosting the teacher's confidence to get involved with food and nutrition activities. The teachers were

stimulated to seek additional resources and ideas from the home economist. An in-service class with 10 workshop sessions was offered to those who were interested. This in-service class was offered three times during the year, had a zero dropout rate and the Spring 1976 session had 33 enrolled which was over the maximum number that the workshop situation could comfortably handle. Many teachers are very interested in learning more about nutrition and how to teach it.

To summarize, the conclusions that the investigator drew from this study were as follows. The nutrition program was beneficial to the students. Longevity in the program increased the effectiveness of the program. An exciting program with stimulating activities such as this one made attitudes toward learning about food and nutrition very positive. Food habits and dietary intake were more difficult to change. Teacher education plays a vital part in nutrition education in the elementary school.

Recommendations

Based on the above conclusion the investigator would make the following recommendations:

1. The nutrition program should continue in Granite School District. Similar programs should be implemented in other school districts. More support and resources from the State School Board would be helpful.
2. The program should be taught in the school at least two years to increase its effectiveness. If this is done by a home economist with a teacher

in-service class offered at the same time, the classroom teachers may be educated and enthused to the point that they would continue to teach the unit on their own. The investigator would then recommend that every fourth or fifth year the home economist go back to the school and present the program and in-service class again to educate new teachers and revitalize the veteran teachers. Nutrition education should be included in the curriculum every year either by a home economist or by the classroom teacher who has been trained in nutrition subject matter.

3. Change in dietary behavior is the goal of nutrition education and seems to be a difficult one to attain. The investigator recommends that a continual ongoing year after year program would be a positive influence. The importance of nutrition and its relationship to health, alertness and well being needs to be stressed. Involvement of parents in the program could help to educate them and remind them of the important role they play in their children's health.

4. Teacher education needs to be a high priority. Ideally there should be some pre-service classes required for elementary school teachers. Since this is not generally the situation at the present time, it is recommended that an emphasis on in-service classes and workshops be made. The investigator feels that the approach used in Granite District with the home economist presenting lessons in the classroom as a model concurrently with a 10 session workshop in-service class has been most satisfactory. A follow up study to see how effective this method is would be helpful.

In summary, the investigator recommends the continuation and expansion of the nutrition program. A program taught and directed by a home economist who has a background in education and nutrition can effectively and factually teach nutrition. The home economist should also be used as a resource person to train elementary school teachers to also be effective and factual when they present nutrition units.

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APPENDIXES

Appendix AThe Elementary School Nutrition Program
in Granite School District

In the school year 1973-74, the elementary school nutrition program in the West Valley Area of Granite School District was started. That year the program took place in eight schools, taught and coordinated by Nancy Sorensen, a certified home economics teacher. By the end of the year 1975-76, every school in the West Area (21 schools) had participated in the program at least one year.

The curriculum of the program consists of a series of six 45-minute lessons. The first lesson is centered around learning or reviewing the Basic Four Food Groups with the upper grades relating this to menu planning. The second lesson is about nutrients. The next four lessons take a different food group each time and they are presented in more depth. The behavioral objectives and learning activities are tailored to meet the needs and interests of the grade being taught. Lessons include games, songs, visual aids and food preparations in the learning activities. The lessons are taught in the regular classroom once a week for six weeks. The lesson outlines follow this narrative.

Table 12 gives a summary of number of participants and some financial information. This program was first funded with Part F vocational money from the Utah State Board of Education. In 1975-76 that money was no longer available for this program; that year the program was funded by Granite District vocational money.

Table 12. Summary of participation in the nutrition program in Granite District

Year	Number of schools	Number of students	Number of teachers	Number of teachers in in-service	Funding source	Number of home economists teaching	Food supply costs ^a
1973-74	8 (All grades)	7430	180	Class not offered	State	1 1/2	\$1,142.00
1974-75	12 (3rd thru 6th)	5103	142	47	State	1	\$1,023.00
1975-76	12 (All grades)	8298	243	63	District	1 1/2	Not calculated
1976-77	14 Projected (All grades)	----	----	Will be offered	District	1 3/4	----

^aAbout 20 cents/student for five tasting experiences.

Starting in 1974, an inservice workshop called Curriculum Development in Nutrition Education for Elementary School Teachers was offered. This was taught by Nancy Sorensen. It was offered for credit through the Extension Class Division of Utah State University. The objectives of this workshop which met once a week for ten weeks were:

1. Increase understanding of and review latest accurate and significant nutrition concepts for the teacher.
2. Introduce and develop new, fun and innovative teaching methods for teaching nutrition to young people.
3. Assist teachers in developing tools for teaching nutrition, that may also be used in other areas such as health, art, science, music, cultural and social development.
4. Give the teacher the opportunity to add to or develop a library of teaching materials.

One of the assignments for this workshop was to prepare a teaching aid or develop a project related to nutrition. Examples of these assignments are included at the end of this appendix.

THE BASIC 4 FOOD GROUPS
5th and 6th grades

Behavioral Objectives:

1. The student will be able to determine in which food groups specific foods belong.
2. The student will be able to write a balanced menu for a day.

Activities:

Discuss why good is important.

Pretest: Name several foods and have students identify which group they belong to.

Review 4 food groups

Using foods from a grocery bag, students will sort them into the 4 food groups

Review number of servings needed per day.

Make a balanced meal using food models from the Dairy Council.

Discuss school lunch, was it balanced?

Determine what a balanced menu for a day is.

Evaluate several menus.

Discuss how snacks fit into the basic 4.

Prepare a basic 4 snack

Taco salad

Work on scrambled word puzzle.

Follow Up:

List different foods eaten for several days in the proper groups.

Write a balanced menu for one day.

MILK

MEAT

FRUITS AND VEGETABLES

BREADS AND CEREALS

Unscramble the words and write them
in the space by the food group they
belong to.

rocn

rnaoeg

amehbgerr

prea

ppeal

kilm

shceee

tacrrros

nioons

iacspnh

oatts

gges

orpk

llors

eecnlas

ryd neabs

mah

ttbure

easp

mile

hfsi

ievrl

kerracsc

eetbs

NUTRIENTS

5th and 6th grades

Behavioral Objectives:

1. The student will be able to list the nutrients in the proper categories; ie. Niacin is a vitamin.
2. The student will tell which food group or groups provide the best sources of each nutrient.
3. The student will be exposed to information about the function of several nutrients in the body.

Activities:

Define nutrient.

Show film strip "How Food Becomes You" from the Dairy Council.

Discuss the six classifications of nutrients using the "Nutes"
(cartoon pictures)

Find out what nutrients we find in each food group by using the comparison charts from the Dairy Council.

Do Vitamin C and fat experiment to show how foods are analyzed for nutritive value. (Details in the "Big Ideas" packet from the Dairy Council.)

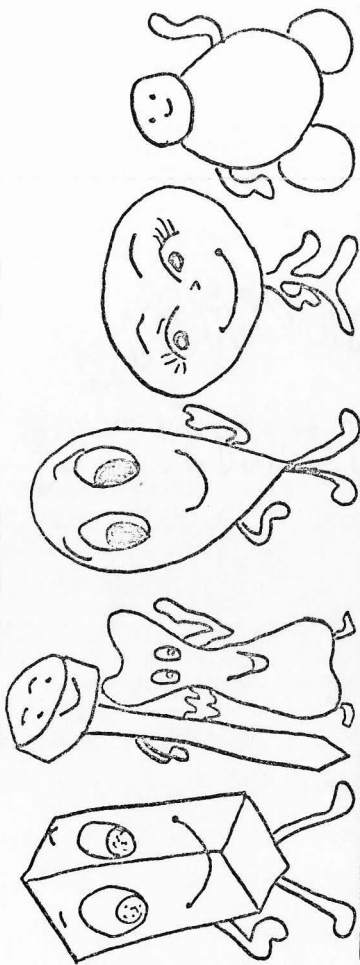
Follow Up:

Do the word puzzle.

If possible have students look up 3 of the nutrients and find their food sources and body function. These are easily found in "How Your Body Uses Food" by the Dairy Council or in the encyclopedia.

Notes:

Nutrients



PROTEINS	MINERALS	VITAMINS	CARBOHYDRATES	FATS
Animal and Vegetable Sources	Iron Calcium and others	Vitamin A B C Thiamine Riboflavin Niacin Vitamin D	Starches Sugars	Oils Cooking fats Butter - Margarine meat fat

Water

FIND THE NAMES

On the block of letters below, find and draw a circle around each of the following words. They may be printed up and down or across. The same letter may be part of more than one word.

Nutrition
Food
Protein
Carbohydrates
Fat
Water
Calcium
Iron

Vitamin A
Vitamin C
Vitamin D
Niacin
Thiamine
Riboflavin
Minerals
Nutrients

X Y Z Q C D B A J L W F R M U V U K
A V K C A L C I U M A Z I I P L K F
T I O F R U K D E M T Q Z N U R J H
B T D X B U P R O T E I N E Y S I S
U A D F O Y R E R G R F Z R J V P A
D H T T H I A M I N E U E A D U O E
N I R S Y T S V R U M K Z L U N B R
U N U V D I Z K O N S F J S O I P Y
T A K H R Q T S F O O D I V Q A J I
R N U F A T U M L C V H O R D C C P
I X I J T V I T A M I N D T W I Q M
T U R L E N B C V Z Y Q P L B N U W
I P O F U M V I T A M I N C V B T
O K N U F M S A N S W F R N O Z G D
N K J O T F K N U T R I E N T S A B

BREADS AND CEREALS GROUP

5th and 6th grades

Behavioral Objectives:

1. The student will name at least 3 grains and a product made from each.
2. The student will explain why it is important to eat foods from this group everyday and how many servings you should have.
3. The student will name at least 3 nutrients found in this group and tell its function in the body. (Carbohydrate, thiamine, niacin, riboflavin, and iron.)
4. The student will define enrichment.

Activities:

Show grain samples, discuss and show pictures of products made from grain.

Using a chart, discuss different parts of a kernel of grain.

Define enriched.

Show "kernel to bread" charts.

Discuss the nutrients found in the bread group.

Look at labels.

Do some exercises to show use of energy.

Explain why we need 4 servings each day.

Show what a serving is.

Discuss the importance of breakfast using posters and clocks.

















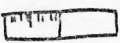









Make and taste Cereal Fruit Breakfast Squares.

Follow Up:

Do the attached worksheet.

Notes:

Sound out the picture words. Put them together to form the names of BREADY CEREAL FOODS.

1. R +  _____
2.  +  _____
3.  +  _____
4.  +  _____
5. C +  _____
6.  +  +  +  _____
7.  +  _____
8.  + ers _____
9.  +  +  _____
10. BRO +  _____
11.  +  _____
12.  + L +  _____
13. DO +  +  = _____
14. S +  + E + L = _____

Cereal Fruit Breakfast Squares

- 1/2 cup butter or margarine
- 4 cups miniature marshmallows
- 1/2 cup instant nonfat dry milk
- 1/4 cup powdered orange breakfast drink
- 1 cup raisens or other dried fruit
- 4 cups round oat cereal such as Cheerios

Melt butter and marshmallows together.

Remove from heat and mix in other ingredients

Put in a 9"x9" pan. Cool and cut into squares.

SEE HOW MANY WORDS YOU CAN MAKE FROM
"SUPERMARKET"

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

FRUITS AND VEGETABLES GROUP

5th and 6th grades

Behavior Objectives:

1. The students will be able to recognize 20 different fruits and vegetables.
2. The students will be able to tell one main function for each of the main nutrients in this food group. (Vitamins A and C)
3. The student will know a good food source for Vitamins A and C.
4. The student will examine a label for nutritive information.

Activities:

Fruit and vegetable riddles (improvised hints)

Examine real produce

Look at chart to see what parts of the plant we eat (from Green Giant Company)

Tell the history of the discovery of Vitamins A and C (from Vitamin Mysteries published by the Dairy Council)

Discuss what vitamins A and C do in the body.

Look at comparison charts from the Dairy Council.

Examine labels.

Discuss care and cooking of fresh fruits and vegetables.

Taste an unusual fruit or vegetable.

Make chocolate fondue with fruit dunkers

Follow Up:

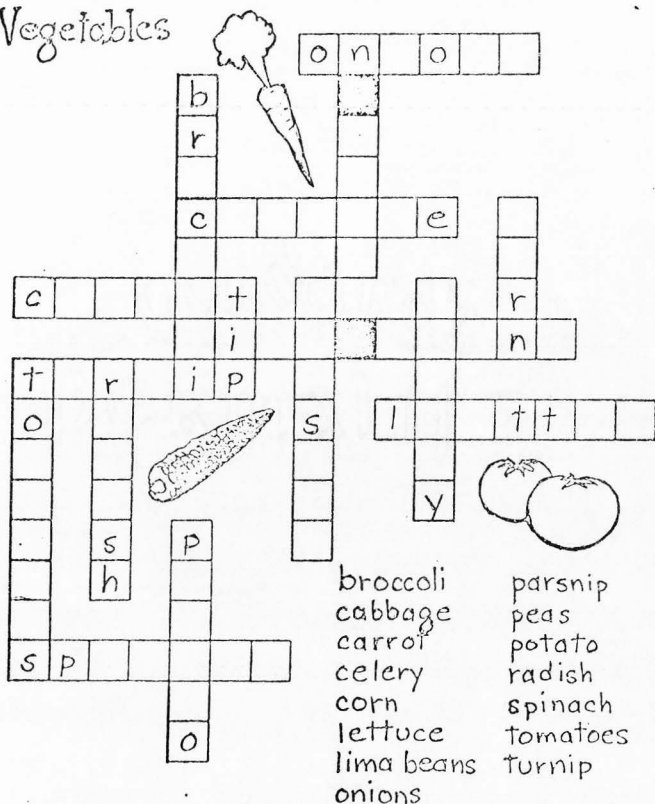
Do the attached puzzles.

Notes:

New York State College of Human Ecology
A Statutory College of the State University
at Cornell University

3520-AM
4/72

Vegetables



Adapted from:
University of Hawaii Cooperative Extension Service
U.S. Department of Agriculture Cooperating
Expanded Nutrition Program

New York State College of Human Ecology, A Statutory College
of the State University, Cornell University, Ithaca, New York

3934-AM
4/72

LET'S MAKE A VEGETABLE SALAD!

All vegetables are given either horizontally or vertically (none diagonally) but may read from right, left, up or down.

REWOLFILUACXTNALPGGE
AEOSNEERGNOILEDNADOG
SWISSCHARDSEPREPEPTA
ESPINRUTASPARAGUSEAB
KALESJHPDEITILCCORB
OKRACTEVIDNEFZESAAPA
HOHCANIPSEIHESSTORRAC
CBEELFANHAKSAONIONTE
IETLLOTATOPAIBARLHOK
TMEIOMETAMUPONIENTO
RTNROCABCEUQSEOTAMOT
ASOYNSTUORPSSLESURB

Artichokes

Asparagus

Bean

Beet

Broccoli

Brussels sprouts

Cabbage

Carrots

Cauliflower

Celery

Corn

Dandelion greens

Endive

Escarole

Kale

Kohlrabi

Okra

Onion

Peas

Eggplant

Pepper

Pimiento

Potato

Radish

Scallions

Spinach

Squash

Swiss chard

Tomatoes

Turnip

How could the vegetables be used in meals and snacks? Do you know what the vegetables look like?

Taken from a Compilation of NUTRITION GAMES AND ACTIVITIES FOR YOUTH, Cooperative Extension Service, Expanded Nutrition Program, Fargo, North Dakota.

MILK GROUP

5th and 6th grades

Behavioral Objectives:

1. The student will name 4 milk products.
2. The student will list 3 nutrients found in milk and tell about the function of each in the body. (calcium, Vitamin A and C, protein and riboflavin)
3. The student will know the names of 3 different kinds of cheese.

Activities:

Tell facts about cows.

Discuss how and why milk products differ using riddles for interest.
Flannel board story of the processing of milk.

Look at labels on milk containers.

Using comparison charts discuss nutrients found in milk group.

Show calcium charts; lists of quantities of food need to give the same amount of calcium in one quart of milk.

Show and discuss pictures of other animals that give milk (Dairy Council Posters)

Explain how cheese is made.

Taste several different kinds of cheese.

Follow Up:

Do attached worksheet.

Show video cassette of "The Day Milk Was Turned Off" (Film available from Utah Dairy Council)

Notes:

Mighty Milk



Milk gives you
proteins

- to help build your body.
- to give you fuel for energy.



Milk gives you
calcium and other
minerals

- to help make your bones and teeth strong.



All these foods were made from milk, but they look and taste different. Why?
Because the milk was treated differently to make each one.

Cheese



Ice Cream



Buttermilk



Dry milk



In each blank write the name of the food which is:

sweet because of added sugar.
sour because of acid.
solid because it is made from curds.
powdery or grainy because it has been dried.

These foods also give you P _____ and the mineral _____.

MEAT GROUP

5th and 6th grades

Behavioral Objectives:

1. The student will name 6 foods from the meat group including 2 meat substitutes.
2. The student will name the nutrients found in the meat group and the major function of each. (Protein, iron, fat, thiamine and niacin).
3. The student will tell how many servings are needed each day from this group.

Activities:

Use riddles to make a list of meat group foods.

Discuss number of servings needed and what a serving is.

Discuss nutrients found in this group.

Tell about high and low quality protein.

Discuss meat customs of different cultures.

Review all 4 food groups by playing concentration or tic tac toe or other nutrition game.

Make and taste sloppy joes made using half TVP and half hamburger.

Follow Up:

Attached sheet may be used either as a test or a worksheet.

Notes:

Name _____

TEST FIVE

1. Fill in the blanks:

- a. The Basic Four Food Groups are: 1. _____
2. _____ 3. _____
4. _____

b. What two food groups do we need 4 or more servings from each day?

1. _____ 2. _____

c. What food group do we need 3 or more servings from each day?

d. What food group do we need 2 or more servings from each day?

2. What are the six types of nutrients?

- a. _____ b. _____
c. _____ d. _____
e. _____ f. _____

3. Breads and cereals are made from six common grains. List four.

- a. _____ c. _____
b. _____ d. _____

4. Name four vitamins we have studied: a. _____, b. _____
c. _____ d. _____

5. Name two minerals important for good health.

6. What are the two color characteristics of fruits and vegetables high in Vitamin A?

- a. _____ b. _____

7. List a vegetable and a fruit that are high in Vitamin A.

a. _____ b. _____

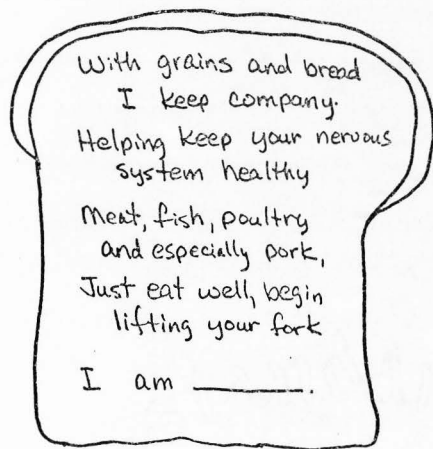
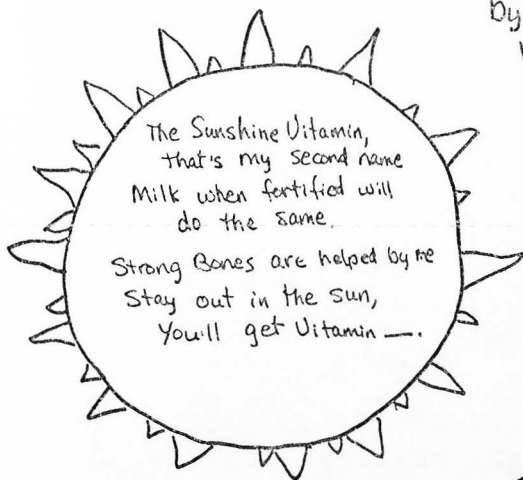
8. Match the nutrient to its use in the body.

- | | |
|------------------------|--|
| 1. _____ Protein | a. makes red blood |
| 2. _____ Iron | b. for hard bones |
| 3. _____ Calcium | c. builds muscles (cells) |
| 4. _____ Vitamin C | d. For healthy nerves and skin |
| 5. _____ Vitamin A | e. for energy |
| 6. _____ Vitamin D | f. for quick energy |
| 7. _____ Fats | g. helps digestion |
| 8. _____ Carbohydrates | h. helps calcium |
| 9. _____ Vitamin B | i. prevents infections and
cements cells together |
| 10. _____ Water | j. eyes |

9. Name at least two foods that have a very high starch content.

10. What group of fruits are highest in Vitamin C? _____

by Susan Ashton
Academy Park School



by David Oreno
Academy Park School

STONE SOUP PROJECT Vegetables

First Day

I started it out with a feeling activity with vegetables in a bag. The children had to describe the vegetable trying to identify it.

We then had a discussion about vegetables centered around where we get them and how we get them.

Second Day

We saw the film "Food From the Sun" followed by a discussion on how plants grow and what different kinds of plants there were.

I gave them the homework assignment to make a list of as many vegetables as they could.

Third Day

We saw the film "Where Our Food Comes From", followed by a discussion on what a vegetable goes through before we get it. We then made a list of all the vegetables we could think of.

Next we talked about different ways of preparing vegetables.
Assignment for tomorrow---bring a vegetable.

Fourth Day

We read the story "Stone Soup" from Houghton-Mifflin second grade reader. We used the vegetables brought by the students and the students made stone soup. We simmered it for 20 minutes and then ate it.

One child commented after we were through, "Now I won't ever have to go hungry, I know how to make stone soup".

Appendix BNutrition Programs in the Elementary
Schools in Utah

In 1973, the Utah Board of Education outlined its goals and general objectives. These goals were expressed in terms of eight human maturities. The physical maturity goal includes three contributing goals pertaining to nutrition. They are: "maintaining a desirable body weight, recognizing the key roles that nutrition and exercise play in weight control; practicing principles of good nutrition; and refraining from participation in or promotion of health fads including the diagnosis of and prescription for ills."

Recently the State School Food Service Department conducted a study that would indicate if these goals were being met. The results of this study are not available yet. However, in interviews with Jean Hamilton and Gladys Gardner, state food service specialists, the investigator determined that there is no state-wide nutrition education program in the lower grades and there is no state recommended curriculum guide. Even so, they referred to several projects in elementary schools in several districts in addition to the program in Granite School District. The investigator had telephone interviews with the personnel involved in most of these programs. The information gleaned from those interviews is summarized below.

Alpine School District: Margaret Johnson, district fourth grade supervisor, strongly supports nutrition education. At their grade level meetings she had brought in resource people to inform the teachers of the principles of

nutrition. As a result, all fourth grades (48 total) teach nutrition. Some of their projects include school food fairs, planting of gardens, nutrition units with food preparation and special bicentennial menus.

Box Elder School District: Spearheaded by Eula Wood, school food supervisor, the fourth grade teachers in two schools in this district have developed a nutrition program center around the "Mulligan Stew" television series developed by the National Extension Service. They use a number of learning activities centered around "finding clues to good nutrition". This correlates with the TV series.

Davis School District: Maxine Reeves, school food supervisor, has collected several films, many visual aids, and references which are available to teachers upon request. A relatively small number of the total 36 schools have used these resources; however, there are plans to make teachers more aware of this service.

Salt Lake District: Under the direction of Beth Brown, home economist, a six lesson curriculum was developed and taught to many children in grades kindergarten through sixth between the years 1972 and 1975. Due to lack of funding, this program has been discontinued. The curriculum guide that they developed should be published in the near future.

Utah State Extension, Salt Lake County: Margie Newman, supervisor of the Expanded Food and Nutrition Education Program, has trained para-professionals who teach a series of six nutrition lessons to elementary school classes. They come at the request of the individual teachers. They

have taught several thousand students in Jordan and Salt Lake School Districts.

Utah State University, Edith Bowen School: Gwen Brown, a graduate student at the university, has developed a curriculum for elementary school children. Unique to her learning activities is the use of the Index of Nutritional Quality. This curriculum will be field tested in the school year 1976-77 in several Utah schools.

Many agencies in Utah come into the school to give presentations about nutrition. Several of these are the Dairy Council of Utah, Mountain Fuel Company, the Dental Association and the March of Dimes.

Appendix C

Eligibility Scale for Free or Reduced
Price Meals and Free Milk

Children from families with a yearly gross income from all sources at or below the following levels should be eligible for free meals or reduced price meals and free special milk. You should use Scale A for free meals and free milk; use Scale B for reduced price meals.

Family Size Income Scale

Family Size	<u>Scale A</u>	<u>Scale B</u>
	<u>FREE MEALS & FREE MILK</u> <u>Yearly Income</u>	<u>REDUCED PRICE</u> <u>MEALS</u> <u>Yearly Income</u>
One	\$0 to \$ 3,230	\$ 3,231 to \$ 5,040
Two	0 to 4,240	4,241 to 6,620
Three	0 to 5,250	5,251 to 8,200
Four	0 to 6,260	6,261 to 9,770
Five	0 to 7,190	7,191 to 11,210
Six	0 to 8,110	8,111 to 12,650
Seven	0 to 8,950	8,951 to 13,970
Eight	0 to 9,790	9,791 to 15,280
Nine	0 to 10,550	10,551 to 16,460
Ten	0 to 11,310	11,311 to 17,640
Eleven	0 to 12,060	12,061 to 18,820
Twelve	0 to 12,810	12,811 to 20,000
Each additional family member	750	Each additional family member 1,180

"Income," as the term is used in this notice, is similar to that defined in the Bureau of the Census report, "Characteristics of the Low Income Population: 1971", Consumer Income, Current Population Reports, Series P-60, No. 86, December 1972. "Income" means income before deductions for income taxes, employees social security taxes, insurance premiums, bonds, etc. It includes the following:

- (1) Monetary compensation for services, including wages, salary, commission, or fees;
- (2) net income from nonfarm self-employment;
- (3) net income from farm self-employment;
- (4) social security;
- (5) dividends or interest on savings or bonds, income from estates or trust or net rental income;
- (6) public assistance or welfare payments;
- (7) unemployment compensations;
- (8) government

civilian employee or military retirement or pensions or veterans payments; (9) private pensions or annuities; (10) alimony or child support payments; (11) regular contributions from persons not living in the household; (12) net royalties; and (13) other cash income. Other cash income would include cash amounts received or withdrawn from any source including savings, investments, trust accounts, and other resources, which would be available to pay the price of a child's meal.

"Income" as the term is used in this notice, does not include income used for the following special hardship conditions which could not be reasonably anticipated or controlled by the household:

(1) Unusually high medical expenses; (2) shelter costs in excess of 30 percent of income as defined herein; (3) special education expenses due to the mental or physical condition of a child; and (4) disaster or casualty losses.

(Snow, 1975)

Appendix DLetters and Forms Used to Obtain Permission to Do
a Study in Granite School District

3549 South 2175 East
Salt Lake City, Utah 84109
June 25, 1975

Dr. Reed Call
Granite School District Superintendent
340 East 3545 South
Salt Lake City, Utah 84115

Dear Dr. Call:

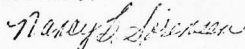
I have been coordinating and teaching the nutrition program in the west area elementary schools for the past two years. As part of my Master's degree program I would like to evaluate the effect of this program on increasing knowledge of nutrition principles and its effect on changing nutrition practices and attitudes.

To do this I would appreciate your permission to give a pre-test and a post-test of about 40 minutes in time to selected fifth grade classes. Except for the control group, the testing would be integrated into the regular program and thus should not be at all disruptive to the classroom routine.

I would like to select randomly one fifth grade class from each of the following schools: Lake Ridge, Whittier, Webster, Magna, Hillsdale, and Monroe. These schools will all be program participants next year. For the control group I would like to select one fifth grade class from Fremont school and one from Plymouth school. These two classes would be tested once in the fall and once in late winter or early spring.

I would appreciate your support in obtaining this data for my thesis. My findings will be available to the district if you desire them. Please contact me if you have any questions concerning this project.

Sincerely,



Nancy B. Sorensen

cc: Phyllis Woodbury

GRANITE SCHOOL DISTRICT

340 EAST 3545 SOUTH • SALT LAKE CITY, UTAH 84115

Telephone (601)



June 24, 1975

Dr. John Reed Call, Superintendent
 Granite School District
 340 East 3545 South
 Salt Lake City, Utah 84115



Dear Dr. Call:

I would like to recommend that Nancy Sorensen be given permission to carry out her study as outlined. The program that she has been involved with has been done through special Home Economics funds, for which I have submitted a proposal. This has been a pilot program based on the fact that nutrition habits of junior and senior high school students seem to change very little following nutrition courses, which lead me to believe a comprehensive nutrition course should be offered in the elementary schools at which time eating habits of children can be affected.

We have gotten excellent mileage on the funds invested in this program since we were able to offer such an attractive in-service class to teachers involved, for which they obtained 3 graduate credits through the Utah State University.

Nancy's study will tell us more precisely how much we are influencing existing habits of 5th graders through this program. Since Grant Rowley has been involved in setting it up and evaluating it in the West Area, you may want to speak with him regarding this study.

Cordially,

Phyllis L. Woodbury
 Staff Associate, Home Economics

/s/

Attachment

GRANITE SCHOOL DISTRICT
340 East 3545 South
Salt Lake City, Utah 84115

Application for Permission to Conduct Research Study

(Note: A copy of the Research Proposal and a copy of
the Instrument must accompany each application.)

Title Knowledge of Nutrition and Its Effect

Researcher Nancy B. Sorensen

Sponsoring Institution Utah State University Chairman _____

Kind of Study (for Master's Degree, Doctoral Study, Other) Master's

Attached is the proposal of a study to be done in Granite School District. The following District facilities and personnel will be required:

Personnel:

1 class of Students in 5th grade classes of Lake Ridge, Whittier, Webster,
" Students in " classes of Magna, Hillsdale, Monroe,
" Students in " classes of Fremont & Plymouth
Teachers in above classes and _____

Time: 40 minutes for pre-test and post-test

Facilities: _____

Equipment: _____

Supplies: _____

Financial Support: _____

Test Scoring: _____

Evaluation of Data: _____

Other: _____

Research Study Subject to Review by Appropriate Division:

Accounting Division

Approved: _____

Pupil Services Division

Approved: _____

Buildings and Grounds Division

Approved: _____

Staff Personnel Division

Approved: _____

Instruction Division

Approved: [Signature]

West Valley Area:

Approved: [Signature] 10-8-75

Final Approval: [Signature]

Superintendent of Schools

Distribution of Copies:

White - Research Applicant

Pink - School Principal

Goldenrod - Superintendent's Office

Project No. 1975-76 - 1

Date Initiated 7/1/75

Appendix E

GRANITE DISTRICT NUTRITION QUESTIONNAIRE

Fifth Grade

_____ 1. Questionnaire No. _____

_____ 2.

_____ 3.

_____ 4.

_____ 5. Boy _____

Girl _____

_____ 6. I attended this school in 4th grade.

Yes _____ No _____ If no, which one _____

_____ 7. I attended this school in 3rd grade.

Yes _____ No _____ If no, which one _____

Yes No

_____ 8. _____ I usually eat a well balanced diet every day.

_____ 9. _____ I think the basic four food groups are a guide to good eating.

_____ 10. _____ It is important for me to eat breakfast.

_____ 11. _____ I like sweet snacks better than fruit, milk or crackers.

_____ 12. _____ I like to try new foods.

_____ 13. _____ I only eat the foods I really know I like.

_____ 14. _____ I think a person should take a vitamin or mineral pills to make sure they get enough nutrients.

_____ 15. _____ I eat breakfast most of the time.

_____ 16. _____ Learning about nutrition is important.

- | | Yes | No | |
|-----------|-------|-------|--|
| _____ 17. | _____ | _____ | I like lessons about foods. |
| _____ 18. | _____ | _____ | I take vitamin pills almost every day. |

List your three favorite snack foods from the list below:

- | | | | |
|-----------|-------|----------|-------------------------|
| _____ 19. | _____ | milk | apple, orange or banana |
| _____ 20. | _____ | soda pop | carrot or celery |
| _____ 21. | _____ | crackers | peanut butter sandwich |
| | | cookies | cookies and milk |
| | | raisins | other |
| | | cheese | never eat snacks |
| | | candy | |

Write the food under the name of the group it belongs in:

- | | <u>Milk</u> | <u>Meat</u> | <u>Fruit & Vegetables</u> | <u>Bread & Cereal</u> |
|-----------|-------------|-------------|-------------------------------|---------------------------|
| _____ 22. | | | | green beans |
| _____ 23. | | | | cheese |
| _____ 24. | | | | crackers |
| _____ 25. | | | | orange juice |
| _____ 26. | | | | eggs |
| _____ 27. | | | | potatoes |
| _____ 28. | | | | tuna fish |
| _____ 29. | | | | pudding |
| _____ 30. | | | | noodles |
| _____ 31. | | | | ham |

- | | T | F | |
|-----------|-------|-------|---|
| _____ 32. | _____ | _____ | You should eat five or more servings every day from the bread and cereal group. |
| _____ 33. | _____ | _____ | Peanut butter, dry beans and eggs can be used as substitutes for meat. |
| _____ 34. | _____ | _____ | A well balanced diet includes eating foods from all four food groups. |
| _____ 35. | _____ | _____ | Food can supply the necessary vitamins and minerals for good health. |
| _____ 36. | _____ | _____ | Breakfast is not an important meal. |

- | | T | F | |
|-----------|-------|-------|--|
| _____ 37. | _____ | _____ | A 5th grader should have three servings from the milk group every day. |
| _____ 38. | _____ | _____ | Foods in the fruit and vegetable group provide alot of vitamins A and C. |
| _____ 39. | _____ | _____ | Bones and teeth need calcium and vitamin D to be strong and healthy. |
| _____ 40. | _____ | _____ | A nutritious snack is one chosen from the four food groups. |
| _____ 41. | _____ | _____ | Proteins' main function or job in the body is to improve your eye sight. |
| _____ 42. | _____ | _____ | When bread is enriched it means vitamins and minerals have been added to it. |

Put a check before the foods you would use to make one balanced lunch. Choose six or less.

- | | | | | |
|-----------|-------|-----------|-------|------------------------|
| _____ 43. | _____ | celery | _____ | banana |
| | _____ | apple | _____ | hamburger with bun |
| _____ 44. | _____ | bread | _____ | ice cream |
| | _____ | steak | _____ | tomato |
| _____ 45. | _____ | roll | _____ | peanut butter sandwich |
| | _____ | turnips | _____ | french fries |
| _____ 46. | _____ | milk | _____ | coke |
| | _____ | porkchops | _____ | candy bar |

Fill in the blank choosing from the foods in the list below. Use only one food for each blank.

- | | | | |
|-----------|-------|-------------------------|----------------|
| _____ 47. | _____ | has a lot of vitamin A. | fortified milk |
| | | | carrots |
| _____ 48. | _____ | has a lot of vitamin C. | oranges |
| | | | sunshine |
| _____ 49. | _____ | gives us vitamin D. | turkey |
| | | | hamburger |
| _____ 50. | _____ | has a lot of calcium. | yams |
| | | | eggs |
| _____ 51. | _____ | has a lot of iron. | cheese |
| | | | grapefruit |
| _____ 52. | _____ | has a lot of iron. | |

Circle the correct answer (only one):

- _____ 53. Iron is needed to build:
- a. bones
 - b. muscles
 - c. red blood cells
 - d. toenails
- _____ 54. Vitamin C is used in the body to:
- a. cement cells together and help resist infection.
 - b. make you run faster.
 - c. improve your eye sight.
 - d. build bones.
- _____ 55. Vitamin A is used in the body to:
- a. give you rosy cheeks.
 - b. prevent nightblindness.
 - c. to build muscle tissue.
 - d. build a healthy heart.
- _____ 56. Calcium's main job is to:
- a. make your hair shiny.
 - b. give you energy.
 - c. build strong bones and teeth.
 - d. fight infections.
- _____ 57. Protein's main job in your body is to:
- a. make your blood red.
 - b. give you healthy nerves.
 - c. give you better posture.
 - d. build and repair body cells.

_____ 58 _____ 59. _____ 60. _____ 61. _____ 62. _____ 63. _____ 64. _____ 65. _____ 66. _____

What I had to eat and drink for 24 hours

What	How Much	Don't write in this column
Breakfast (this morning)		
Snacks, if any (this morning)		
Noon meal (today or yesterday)		
Snacks, if any (between noon and evening meals yesterday)		
Evening meal (yesterday)		
Snacks, if any (last night after evening meal)		

VITA

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Candidate for the degree of

Masters of Science

Thesis: The Effect of a Nutrition Program on Knowledge of Nutrition and Nutrition Attitudes and Practices of Fifth Grade Students in Granite School District

Major Field: Home Economics and Consumer Education

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